CLAIMS

1. A centrifugal fan comprising:

a plurality of blades circularly arranged, wherein the plurality of blades are interposed between a ring-like lateral plate and a main plate, and integrated;

a casing including therein the plurality of blades, wherein the casing has a discharge outlet, and a bellmouth-like inlet with an internal diameter equal to that of the plurality of blades circularly arranged; and

a motor with a rotation axis thereof connected to the main plate, wherein the motor is fixed to the casing,

wherein each of the plurality of blades has a plurality of asperities on at least one side of dorsal and ventral sides thereof,

wherein a side of the lateral plate of the plurality of blades is arranged at the inlet, and

wherein the asperities are formed with a projection and a recess alternately repeated from a front edge toward a rear edge thereof in a cross section vertical to a rotation axis of the plurality of blades.

2. The centrifugal fan as claimed in claim 1, wherein the main plate has a substantially truncated-cone-shaped throttle projecting toward the lateral plate.

3. The centrifugal fan as claimed in claim 1, wherein an inside of the casing is formed spirally.

4. The centrifugal fan as claimed in claim 1, wherein an internal diameter of the plurality of blades increases from the main plate toward the lateral plate.

5. The centrifugal fan as claimed in claim 4, wherein an internal diameter of the plurality of blades increases linearly from the main plate toward the lateral plate.

6. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a recess of the asperities is arc-shaped.

7. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a projection of the asperities is arc-shaped.

8. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a shape of the asperities is formed with arcs continuously repeated.

9. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a recess of the asperities is triangle.

10. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a projection of the asperities is triangle.

11. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a shape of the asperities is formed with triangles continuously repeated.

12. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein a shape of the asperities is formed with quadrangles continuously repeated.

13. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein X, distance between a rotation center of the plurality of blades circularly arranged and a position at an internal diameter of the asperities, in a direction of a rotation axis, remains constant; and wherein distance between the rotation center and a position at an external diameter of the asperities remains constant.

14. The centrifugal fan as claimed in claim 13, wherein relationship among X which is the distance, D1 which is an internal diameter of the plurality of blades circularly arranged, and D2 which is an external diameter of the same, is to be $D1 < 2X < D1 + 0.35(D2-D1)$.

15. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein distance between a rotation center of the plurality of blades circularly arranged and a side of an internal diameter of the asperities increases toward the main plate.

16. The centrifugal fan as claimed in one of claim 1 and claim 4, wherein relationship among X which is distance from a rotation center of the plurality of blades circularly arranged to a popsition of the asperities at an internal diameter thereof, D1 which is an internal diameter of the plurality of blades circularly arranged, and

D2 which is an external diameter of the same, is to be $D1 < 2X < D1 + 0.35(D2-D1)$.

17. The centrifugal fan as claimed in one of claim 1 and claim 4,

wherein a ratio between h which is depth of a recess of the asperities, and t which is board thickness of the plurality of blades, is to be $0.1 < h/t < 0.7$;

wherein a ratio between f which is width of a recess of the asperities, and h which is the depth, is to be $0.5h < f < 2.5h$; and

wherein relation between Y which is distance of the asperities from the lateral plate in a direction of the main plate, and H which is height of the plurality of blades, is to be $0.1 < Y/H < 1.0$.

18. An apparatus arranged with the centrifugal fan as claimed in one of claim 1 and claim 4.

19. The apparatus as claimed in claim 18, wherein the apparatus is one of an air conditioner, ventilating blower, air purifier, humidifier, and dehumidifier.

20. A centrifugal fan comprising:

a plurality of blades circularly arranged, wherein the plurality of blades are interposed between a ring-like lateral plate and a main plate, and integrated;

a casing including therein the plurality of blades, wherein the casing has a discharge outlet, and a bellmouth-like inlet with an internal diameter equal to that of the plurality of blades circularly

arranged; and

a motor with a rotation axis thereof connected to the main plate,

wherein an outlet angle at an outer circumference of the plurality of blades varies gradually from a side of the main plate toward a side of the lateral plate.

21. The centrifugal fan as claimed in claim 20, wherein the main plate has a substantially truncated-cone-shaped throttle projecting toward a side of the lateral plate.

22. The centrifugal fan as claimed in claim 20, wherein an inside of the casing is formed spirally.

23. The centrifugal fan as claimed in claim 20, wherein a part or whole of the plurality of blades are twisted so that an outer circumference at a side of the lateral plate of the plurality of blades moves behind an outer circumference at a side of the main plate in rotation direction.

24. The centrifugal fan as claimed in claim 23,

wherein relationship among X1 which is distance between a rotation center of the plurality of blades and a position at which twisting starts, D1 which is an internal diameter of the plurality of blades, and D2 which is an external diameter of the same, is $D1/2 < X1 \leq D1/2 + 0.9(D2-D1)/2$; and

wherein relationship between Y which is a position at which twisting starts from the lateral plate in axial direction, and H which is

height of the plurality of blades, is $0.2H < Y \leq H$.

25. The centrifugal fan as claimed in one of claim 20 and claim 24, wherein an external diameter of the main plate is equal to or smaller than twice of distance between a rotation center of the plurality of blades and a position at which twisting starts.

26. The centrifugal fan as claimed in claim 25, wherein an external diameter of the main plate is smaller than an external diameter of the plurality of blades.

27. The centrifugal fan as claimed in one of claim 20 to claim 24, wherein the internal diameter of the plurality of blades circularly arranged increases from the main plate toward the lateral plate.

28. The centrifugal fan as claimed in claim 27, wherein the internal diameter of the plurality of blades increases linearly from the main plate toward the lateral plate.

29. The centrifugal fan as claimed in claims 20 through 24, wherein a surface of each dorsal side of the plurality of blades is made so as to be rough or to have a large number of asperities.